NCSU/BECKY KIRKLAND

Mechanical engineer Gregory Buckner (right) works with a graduate student.

advisers who have business and legal expertise. After tools are sold, new applications might come to light, and the company can develop these or create spin-offs to do so.

BUILDING SKILLS

Just like researchers, toolmakers can learn through an apprenticeship of sorts. "As a more-junior graduate student, one can learn these skills very deeply by working with more-senior graduate students, postdocs and principal investigators," says Samuel Hess, a physicist at the University of Maine in Orono who has invented high-resolution imaging methods. Degrees in fields such as biomedical engineering or computational biology can help people to build skills at the intersection of toolmaking and medicine or biology. Even after obtaining their PhDs, toolmakers can learn or refine their skills by working with more-experienced researchers during a postdoctoral fellowship, on sabbatical or in industry. Whenever it happens, learning to build is a hands-on process — with a lot of mistakes made along the way, says Betzig.

Many established toolmakers are essentially self-taught and self-motivated. "I hire lots of programmers and engineers. The best programmers are always former biologists who pick up the programming bug," says Chris Beecher, an analytical chemist and co-founder of IROA Technologies in Ann Arbor, Michigan, who has invented platforms that quantify the small molecules produced by metabolism in cells or tissues.

At Waters Corporation, an analytical science instrumentation company based in Milford, Massachusetts, some of the product developers are not engineers, but scientists who have previous experience using analytical chemistry instruments as part of their research, so they know what customers need, says Steven Cohen, life-sciences director in research and development at the company. Such developers work with a manufacturing workshop to design instruments and build prototypes.

In academia and the non-profit sector, tool development is often funded through a larger research project. But researchers can also apply for grants specific to tool building. Genome Canada in Ottawa, for example, supports the development of genomic technologies through funding competitions. Naveed Aziz, the organization's director of technology programmes, says that he receives funding applications led by bioinformaticians as often as by researchers. And the US National Science Foundation (NSF) runs an Instrument Development for Biological Research grant to support development of tools that enable new research capabilities, markedly improve current technology or transform a prototype into something more broadly usable.

Several US federal agencies — the NSF, the National Institutes of Health and the Department of Defense — also offer Small Business Innovation Research and Small Business Technology Transfer grants, which aim to spur technological innovation and lower the barriers to commercialization. The Wellcome Trust in London, one of the world's biggest biomedical research charities, uses its Translation Fund and Health Innovation Challenge Fund to speed the commercialization of biomedical technologies.

"One can learn these skills by working with more-senior graduate students, postdocs and principal investigators."
Samuel Hess

Grants like these can help toolmakers make a lasting difference to a given field. It is always nice to go "beyond the narrow scope" of the original project, notes Charles Schmitt, director of informatics at the Renaissance Computing Institute, based in Chapel Hill, North Carolina. But although it is gratifying when a tool is adopted widely, it sometimes means that toolmakers must train others to use their inventions, and must surrender control to groups with their own skill sets and agendas. Toolmakers can take pride in their impact, but lose command of their brainchild. Moving on, says Schmitt, "is always a big challenge". ■

Kelly Rae Chi *is a freelance writer based in Cary, North Carolina.*

CHEMISTRY

Improving lab safety

A US National Research Council committee met on 15–16 May in Washington DC to start developing safety recommendations for chemical researchers in academic and national laboratories. The project was spurred in part by three high-profile accidents at US academic laboratories between 2008 and 2011. Behavioural scientists, chemists and safety experts will identify problems at research institutions and learn from effective safety systems in industry to develop the recommendations, which will be released next spring. Chemists and behavioural scientists "can learn from each other," says committee chairman Holden Thorp, chancellor of the University of North Carolina at Chapel Hill.

BRAIN DRAIN

Workers flee corruption

A growing number of highly skilled workers including researchers are leaving corrupt nations where government officials demand bribes and control access to the labour market, finds a study published on 17 May (A. Ariu and M. P. Squicciarini *EMBO Rep.* http://doi.org/mkh; 2013). Nations with relatively low corruption benefit from an influx of scientists who write influential papers and patents and create businesses, says the study, which examined movement patterns in 123 nations against an international corruption index. "It is not a positive thing for a researcher to be in a country that is highly corrupt," says study co-author Mara Squicciarini, an economist at the Catholic University of Leuven in Belgium.

IMMIGRATION

Postdocs hit by scam

Confidence tricksters are targeting international postdocs and students in the United States, according to complaints passed on to the National Postdoctoral Association (NPA) in Washington DC. Telephone callers claiming to be from US Citizenship and Immigration Services (USCIS) tell trainees that they have improperly completed a form, and that they face a fine or deportation. This is not agency procedure, says the NPA. Callers know the target's name, date of birth, address, phone number and case number. People who suspect that they have been targeted should report the scam at go.nature.com/poexjx. The USCIS did not respond to requests for comment.